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Valuation of Société Générale

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☒ *PUBLIC REPORT* ☐ *CONFIDENTIAL REPORT*

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Executive summary

In 2008, the United States and indeed the world, experienced the worst financial crisis since the Great Depression (1930). The 2008 financial crisis demonstrated the importance of the financial industry and, in particular, the prominence of banks in the economy.

When the stock prices of strongly consolidated entities in the United States such as Merrill Lynch, Citigroup or Lehman Brothers sank, the fragility of the financial system became evident. As a result, the confidence of shareholders and customers in banks as a safe place to deposit their savings disappeared.

The structural failures of the financial institutions during the global financial crisis have made us more aware of the high dependence of the entire economy (consumption, spending, investment, employment) on the health of financial institutions. Without bank loans, advisory from banks and investment firms, or insurance coverage, the real economy would sink.

This research Paper aims to provide a springboard for understanding the role of banks in the economy and analysing the different valuation methodologies used for banks. There are many challenges in analysing a bank, due to its cyclicality, forms of reporting and regulations to which they are exposed.

Section I: Introduction to the banking industry

1.1. Composition of the financial industry and its role in the economy

The financial industry is a conglomerate formed by financial intermediaries called "financial institutions", which play a key role in the economic cycle.

As a key component of the financial system, financial institutions allow the transfer of money between savers and investors and borrowers. In this sense, any entity that offers financial products and services to people or other entities can be classified as a financial institution.

Financial institutions can be grouped into four categories depending on their main source of income.

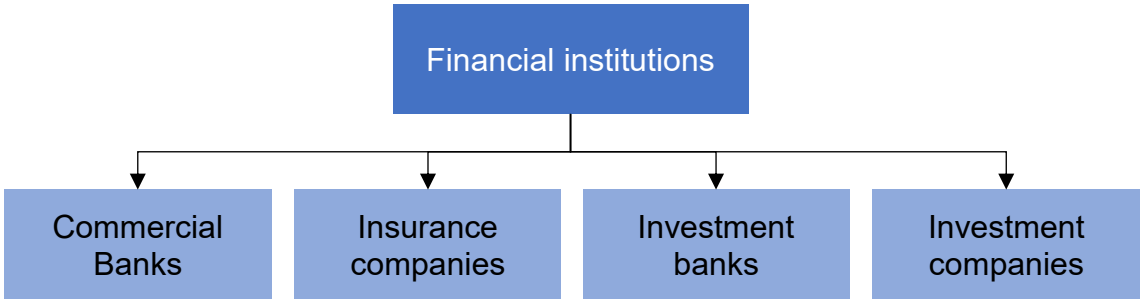


Figure 1 *Types of financial institutions*

A *Commercial Bank* is an institution that accepts deposits from individuals, business, financial institutions and governments to then channel these resources and lend them in the capital market to the different economic activities. Therefore, banks are financial intermediaries between individuals facing capital deficit and individuals with surplus capital.

When banks grant loans, they face credit risk (risk of not recovering the credit), liquidity risk (maturity of liabilities), interest rate risks and fluctuations of the

exchange rate among others. Banks mitigate this risk by charging a higher interest rate to borrowers than the one they pay on depositors' accounts.

Banks play an important role in the economy, as they help achieve economic efficiency which is essential for the development of the economy. In fact, there is an important correlation between the level of bank credit and the development of an economy. The countries that have a low penetration of the banking system are generally developing countries while the more developed economies have a high presence of the banking sector in their economic activities.

Access to credit is vital for the dynamism of the economy because thanks to these resources it is possible to create new investment projects that lead to the improvement of productivity and competitiveness of companies. This is why access to financial services can achieve better conditions in terms of opportunities and welfare of the population.

Insurance companies have basically two main sources of income. One of them consists in the premiums paid by those who want to have a coverage from a loss, damage, injury or treatment. The other one comes from the investment of the premiums paid by customers.

Investment banking is the division of a bank specialised in obtaining funds for a specific investment or financing projects through the issuance and sale of fixed and variable income securities in the capital markets. Investment banks also offer advice in merger and acquisition processes, they act as a broker and/or financial adviser for institutional clients and trade securities in their own accounts.

Investment companies collect funds, assets or rights from their clients to manage and invest them in goods, rights or securities. Their main source of income comes from the advisory and management fees of the investment portfolios.

With the recent consolidation of the financial services industry, some entities operate in more than one of the above groups. For example, *Universal Banks* (from now on, referred as “banks”) operate in the four business lines stated throughout this section.

1.2. What makes banks unique

A bank, like any other company, aims to have a profitable business model, increase its revenues, offer innovative products and overcome the competition. However, they differ from non-financial companies mainly in four aspects which make them special when doing its valuation. First of all, banks have different accounting rules when measuring their benefits and valuing its assets. Secondly, banks operate under some regulations. Third, debt for banks is rather a “row material” than a source of financing. Finally, some terms used for analysing a non-financial entity such as capital expenditure or working capital cannot be used for banks. Hereafter, these four aspects will be further explained.

1.3.1 Accounting rules

Concerning the accounting rules, banks differ from non-financial entities in two aspects. The first one is that the vast majority of the assets of a bank are financial instruments such as bonds or stocks, which are quoted on an active market. Hence, banks mark assets to the market value in order to capture the fair value of the security instead of its original cost.

The second aspect is that in order to homogenise periods of gains and losses, some accounting rules have been developed to smooth out the earnings and losses. As stated in section 1.1, banks make money on the interest spread between the interest paid to depositors and the interest charged to borrowers. In this context, to combat credit risk – risk that an individual or company does not return the funds – and interest risk – risk that interest rates change over time – banks incorporate in their financial statements an accounting entry called

provision. Banks create provisions with the average historical losses from these risks. Each bank is responsible for calculating its provisions, which are subjective in nature. Therefore, a conservative bank will have greater loss provisions (which will decrease its profits) than a risk seeking one.

1.3.2 Bank regulations

Another characteristic of banks is the regulation under which they operate. After the collapse experienced by banks during the financial crisis it became evident that banks were exposed to credit, market and operational risks from which they were not covered. In order to prevent banks from going bankrupt, governments around the world had to put together bailout packages to purchase bad assets.

In response to the financial crisis, the European Banking Authority developed an international regulatory accord known as Basel III. The objective of Basel III is to ensure that banks do not expand their operations beyond its traditional business and that the deposits and investments of depositors and clients are not at risk.

First of all, banks must maintain capital ratios to operate, which are computed over the book value of capital and the total assets in their operations. This is a measure that will absorb shocks in the case it turns out to be another financial crisis. Second, banks have limitations on where they can invest their capital. For example, banks can invest in the stock market but, as it is volatile, they have an amount constraint, so that they can repay their depositors at any time. Third, the entry of new banks into the market as well as the corporate operations among them (mergers, acquisitions, etc.) are also controlled by the regulatory authorities.

1.3.3 Debt and equity

From the theory we know that non-financial companies have two ways of financing: debt and equity. However, banks do not use debt as a source of

funding but rather as a “raw material”. Debt is for banks what “wood” can be for a “carpenter”, something that will be converted into a product to sell and make money.

It is worth defining what banks consider as debt. The question here is if deposits from customers should be considered as debt or no. The answer is no, because if we included the deposits as debt, the operating income of a bank should be calculated before the interest paid to the depositors, which would be problematic since deposit interests are normally the biggest expense of a bank.

1.3.4 CAPEX and cash flow, are they feasible for banks?

Defining the reinvestment for a bank, traditionally understood as an investment in fixed assets, "Capital Expenditure", and operational financing needs, "Working Capital", is not that it is difficult, but rather impossible for a bank - therefore, cash flows cannot be calculated.

On the one hand, differently from the usual operations in production companies, which invest in real estate, machinery and other fixed assets; banks invest mainly in intangible assets: brand, reputation and human capital, among others. Consequently, what we traditionally understand as capital expenditure, within the cash flow statement, is often classified as operating expenses within the profit and loss account. Therefore, the cash flow statement of a bank normally includes a capital expenditure entry of very little or no amount.

On the other hand, the problem with the working capital is different. Defining working capital as inventories, plus accounts receivable, minus accounts payable, these entries are not typical for banks, and therefore, would not make sense to analyse them. Moreover, it is difficult to calculate the amount of current liabilities of a bank, as they rely on deposits from customers, and it is difficult to know when clients want their deposits back.

1.3. Analysing the financial statements of a Bank

Before valuing Société Générale it is important to understand the financial statements of a bank as they differ from the ones of a manufacturing company. Below, I will present the most important entries of the profit and loss account and the balance sheet statement of Société Générale.

€m	2016	2017	2018
Net interest income	**9,467**	**10,416**	**11,019**
Net commission income	6,699	6,823	5,524
Net trading income	7,143	5,826	5,189
Net income from other activities	1,989	889	3,473
Total revenues	**25,298**	**23,954**	**25,205**
Operating expenses	(16,817)	(17,838)	(17,931)
Operating income	**8,481**	**6,116**	**7,274**
Provisions	(2,091)	(1,349)	(1,005)
Net operating profit	**6,390**	**4,767**	**6,269**
Other non-oper. income / (expense)	(83)	371	(152)
Pre-tax profit	**6,307**	**5,138**	**6,117**
Taxes	(1,969)	(1,708)	(1,561)
Net income	**4,338**	**3,430**	**4,556**
Non-controlling interests	(464)	(624)	(692)
Net income to shareholders	**3,874**	**2,806**	**3,864**

Figure 2 *Profit and loss account of Société Générale*

As stated in previous sections, the largest component of a bank's revenue is obtained by selling loans to borrowers at a determined interest rate. However, they also have to pay for acquiring this money from their clients. The difference between the interest rate earned from borrowers and the interest rate paid to deposit owners is reflected in the first line "Net interest income" of the profit and loss account.

Moreover, apart from this source of income, banks also make money by charging fees and commissions for the services they offer such as managing investment assets, offering credit cards, buying and selling currencies or accepting saving deposits. This income is captured under "Net commission income".

The “Net trading income” entry represents the gains and losses a bank makes from positions in financial instruments. This can be a very broad category, covering positions in bonds, traded loans or interest rate positioning.

“Income and expenses from other activities” mainly include real estate development and insurance activities.

Having defined all the operating revenues, the following line of the profit and loss account “Operating expenses” mainly contains personnel expenses, consulting fees, amortization and depreciation.

The last operating item for banks is provisioning against bad debts. “Provisions” are expenses incurred to account for expected credit losses, such as customer defaults, renegotiation terms of a bank’s loan or against any credit exposure such as sovereign bonds.

Once defined the most important entries of the profit and loss account I will present the condensed balance sheet statement of Société Générale.

€bn	2015	2016	2017	2018
Cash, due from central banks	78.6	96.2	114.4	96.6
Interbank loans	71.7	59.5	53.7	60.6
Net loans	405.3	426.5	417.4	447.2
Financial assets	674.4	661.6	443.9	439.5
Investment of insurance companies	-	-	147.6	146.8
Equity method investments	1.4	1.1	0.7	0.2
Intangible assets	6.0	6.3	6.9	6.9
Fixed assets	18.0	24.3	22.3	38.1
Tax assets	7.4	6.4	6.3	5.8
Other assets	71.9	72.5	61.1	67.8
Total assets	**1,334.4**	**1,354.4**	**1,274.2**	**1,309.4**
Retail funding	379.6	421.0	410.6	416.8
Wholesale funding	663.8	630.1	566.0	579.8
Subordinated debt	13.0	14.1	13.6	13.3
Hedging derivatives	9.5	9.6	6.1	6.0
Provisions	5.2	5.7	6.3	4.6
Tax liabilities	1.6	1.4	1.6	1.2
Other liabilities	198.9	206.7	206.9	221.9
Total liabilities	**1,271.7**	**1,288.7**	**1,211.3**	**1,243.6**
Equity	59.0	62.0	58.4	61.0
Minority interests	3.6	3.8	4.5	4.8
Total equity	**62.7**	**65.7**	**63.0**	**65.8**
Total liab. and equity	**1,334.4**	**1,354.4**	**1,274.2**	**1,309.4**

Figure 3 *Balance Sheet of Société Générale*

Although bank balance sheets are analysed less exhaustively than income statements, they are crucial to understand the asset quality, credit risk, capital adequacy, leverage and funding of financial institutions.

On the asset side of the balance sheet we find, first of all, “Cash, due from central banks” which is cash that the bank holds on deposit and on the central bank as a form of reserve. The central bank of France, “Banque de France”, as in other countries, obliges all commercial French banks to hold a minimum reserve requirement of their liabilities (customer deposits). The objective of this money is to prevent banks against unexpected events such as a large withdrawal of money by clients. That is because banks would prefer to put all the money available from depositors to work earning interests, that is offering loans or investing it, rather than keeping it at a low interest rate.

Loans and financial assets represent the largest portion of the balance sheet. The former can be divided into “interbank loans”, which is money extended to other financial institutions at the interbank rate, and “net loans”. Concerning loans, this category is presented in the balance sheet after impairments also called loan loss reserves. They represent the amount though to be adequate to cover estimated losses in the loan portfolio. When a loan is charged off, it is removed from the loan portfolio, and its book value is deducted from loan loss reserve. Lenders also set aside reserves for nonaccrual loans, in which interest and principal payments are no longer being collected.

Banks also make money from their position in “Financial assets” which can be divided into three categories: fixed income securities, equity securities and derivatives. Fixed income securities include bonds, treasury bills, preferred shares or any other instrument that pays out a fixed amount of money. Equity securities are positions in company stocks that provide income in the form of dividends which fluctuate in time. Derivatives are financial contracts whose value is derived from changes in publicly traded securities, interest rates, currency exchange rates or market indices. They cover a wide assortment of financial contracts, including but not limited to forward contracts, futures, options and swaps.

The other side of the balance sheet is mainly composed by “Retail funding” and “Wholesale funding”. The former includes savings from individuals and companies and can be divided into term and demand deposits. Term deposits also referred as time deposits, are deposits in which the customer gives an amount of money to the bank for a determined period of time in exchange of some interests. Depositors are not allowed to withdraw the money invested. Demand deposits pay lower interests, but the customer is free to withdraw the funds at any time.

Finally, wholesale funding is formed by central banks deposits, interbank deposits, debt securities and financial liabilities at fair value through profit or loss.

Section II: Valuation of Société Générale

2.1 Description of Société Générale

2.1.1 France macro overview

With 67.2m people as of 2018 and a surface of 643.8km^2, France has the third largest population in Europe and is the biggest country of eastern Europe. Moreover, France secures a place among the top twenty economies globally.

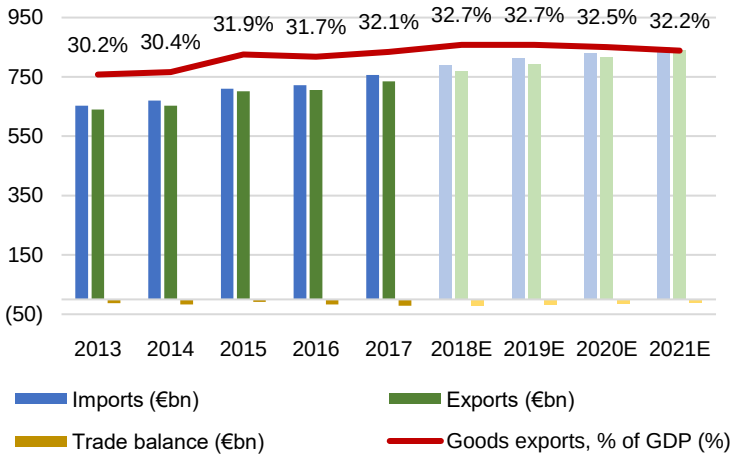


Figure 4 *France's exports, imports and trade balance. Source: BMI*

France is a large importer and exporter of goods and services, with a CAGR '13-'17 of 3.7% and 3.5% respectively. French exports accounted for the 32.1% of its GDP as of 2017 and reached the €735.0bn in 2017, while imports stood at €756.7bn. Therefore, France incurs a trade deficit, which is expected to remain constant in the coming years as a result of the stagnation of exports and imports. Foreign demand is expected to be less significant in the short term due to the low evolution of the French partner countries, but this will be compensated by a higher household purchasing power.

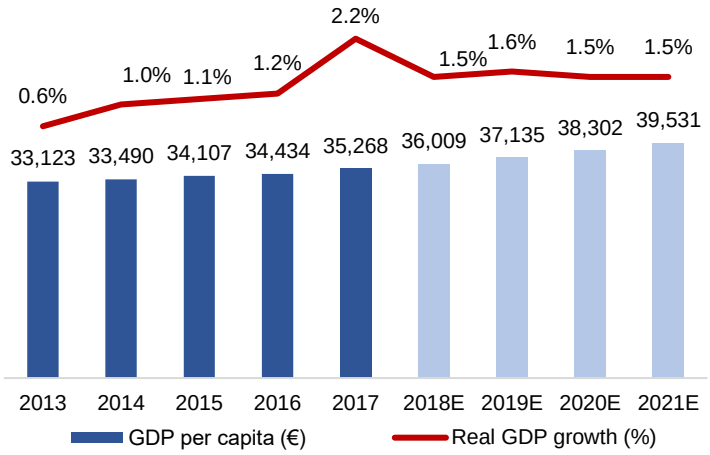


Figure 5 *France GDP. Source: BMI*

Real GDP has grown by 2.2% in 2017 and is expected to continue growing at around 1.5% per year due to the high investment activity, increase of household consumer spending and strong export performance. 2017 GDP growth rate has been the highest since 2011. However, the rise of prices has led to an increasing rate of inflation, which still is, though, at standard levels.

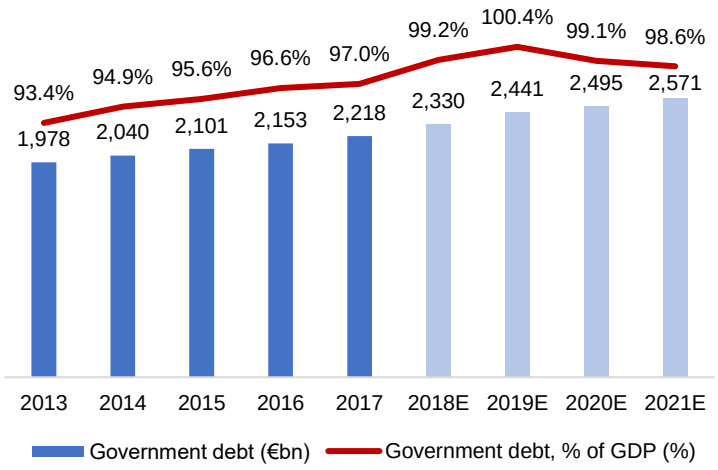


Figure 6 *France general Government debt. Source: BMI*

France government's debt is very high and has reached alarming levels. As it can be seen, the debt as a percentage of GDP was 97.0% in 2017, well above the EU limit of 60.0%. This trend is forecasted to continue during the following years, but with the expectation that in 2020 it will start decreasing. Since a great amount of the French sovereign debt is held by foreign investors, the

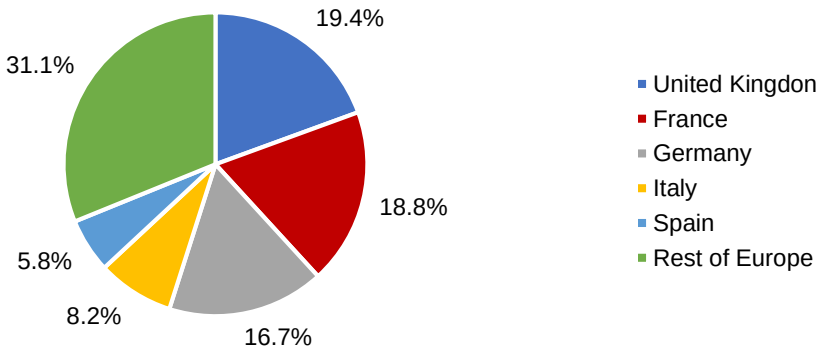
government should take some measures to decrease them and do not lose their faith in it.

Concerning government deficit, France's expenditures exceeded in a 2.6% its revenues, marginally below the limit set by the EU (3%). Both elevated debt and high deficit in France are caused by the tradition of being a large welfare state, which can only be achieved in case of high tax receipts.

2.1.2 Landscape of French banking sector

The French banking sector is one of the most robust systems in Europe, it has improved gradually since the global economic crisis and has become more resilient over the past few years. According to the OECD, the banking industry is one of France's six main economic assets.

France holds 18.8% of the European banking total assets market share. Hereafter it can be seen the segmentation of the banking industry in Europe.



Total assets as of Dec 2018: **€47,591bn**

Figure 7 *Geography segmentation of the banking industry (Dec 2018). Source: Marketline*

In order to assess the volume of the banking industry in France we can analyse the performance and the market capitalization of the three biggest French

banking groups traded in the CAC 40[1] (BNP Paribas, Crédit Agricole and Société Générale) and AXA, the biggest insurance company in Europe.

Companies	Market cap. (€m)	Percentage (%)
LVMH Moet Hennessy Louis Vuitton	168,932	10.26%
L'Oréal	133,697	8.12%
TOTAL	132,038	8.02%
Sanofi	98,844	6.00%
Airbus	91,006	5.53%
Kering	66,473	4.04%
Hermes International	63,342	3.85%
AXA	55,688	3.38%
BNP Paribas	54,872	3.33%
Safran	50,055	3.04%
Vinci	52,654	3.20%
Air Liquide	49,001	2.98%
Danone	46,926	2.85%
Pernod Ricard	42,680	2.59%
EssilorLuxottica	42,226	2.56%
Schneider Electric	41,500	2.52%
Orange	38,850	2.36%
Dassault Systemes	34,863	2.12%
Vivendi	33,688	2.05%
Engie	32,511	1.97%
Credit Agricole	32,004	1.94%
Societe Generale	21,503	1.31%
Peugeot	20,838	1.27%
Unibail-Rodamco-Westfield	20,724	1.26%
ArcelorMittal	19,743	1.20%
Michelin	19,738	1.20%
Cie de Saint-Gobain	18,330	1.11%
Capgemini	18,168	1.10%
Renault	18,110	1.10%
Legrand	16,136	0.98%
Sodexo	14,589	0.89%
Carrefour	13,133	0.80%
STMicroelectronics	12,843	0.78%
Bouygues	12,156	0.74%
Veolia Environnement	11,329	0.69%
Publicis Groupe	11,024	0.67%
Accor	10,482	0.64%
TechnipFMC	9,723	0.59%
Atos	9,224	0.56%
Valeo	6,785	0.41%
Total CAC 40	**1,646,429**	100.00%
Total financial institutions	**164,067**	9.97%

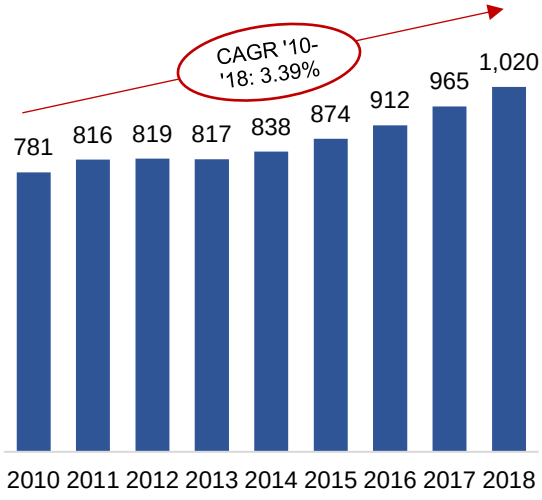
Figure 8 *CAC 40 market capitalization as of 02/04/2019. Source: Factset*

It can be seen that financial institutions account for c.10% of the total CAC40 market cap., being BNP Paribas the biggest bank in terms of market cap (€54.9bn).

[1] *Cotation Assistee en Contin*u. The CAC 40 is a free float market capitalization weighted index that reflects the performance of the 40 largest and most actively traded shares listed on Euronext Paris. (Bloomberg)

In macroeconomic terms, credit supply in France has sped up over the last years, due to the low interest rate environment in Europe which has boosted demand since the implementation of quantitative easing. Bank credit to firms has increased with a CAGR ’10-’18 of 3.4%, in particular to SMEs, which represented 43.6% of total loans to business in December 2018.

As it can be seen in the graphic below, mortgages have increased since 2010 with a CAGR of 4.4%. Moreover, long term loans have won share in comparison to short term ones, which is a proof of confidence and quality of credit.



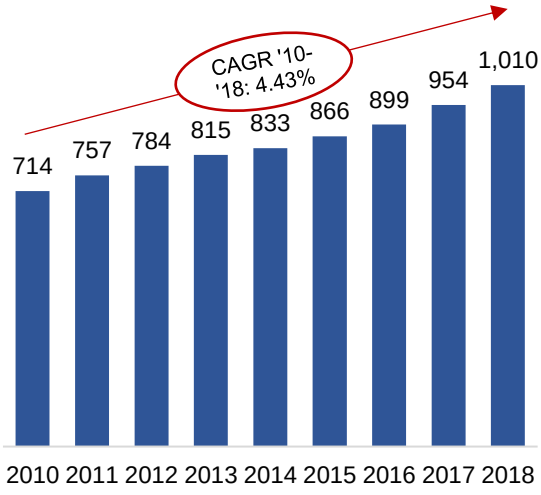


Figure 9 *Total loans to business. Source: Banque de France* *Total house loans. Source: Banque de France*

French banking total assets stood at €8,931bn in December 2018. With a CAGR ’14-’18 of 1.57%, total assets have increased at a slower pace than credit. In comparison, the German and the UK banking industry achieved a compound annual growth rate of -0.2% and 3.3% respectively over the same period.

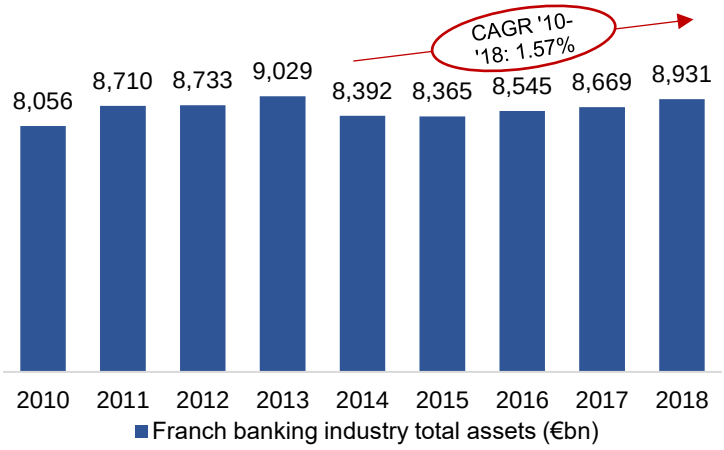


Figure 10 *Total assets. Source: Marketline.*

The French banking industry is mainly dominated by six banking groups: BNP Paribas, BPCE, Groupe Crédit Agricole, Groupe Crédit Mutuel-CIC, Sociéte Générale and Banque Postale. The Bank of France is the country's national monetary authority and is responsible of defining the monetary strategy of the country, ensuring the financial stability and providing services to individuals, entities and the French state. Hereafter, you will find some rankings of the top-6 French banks as of December 2018.

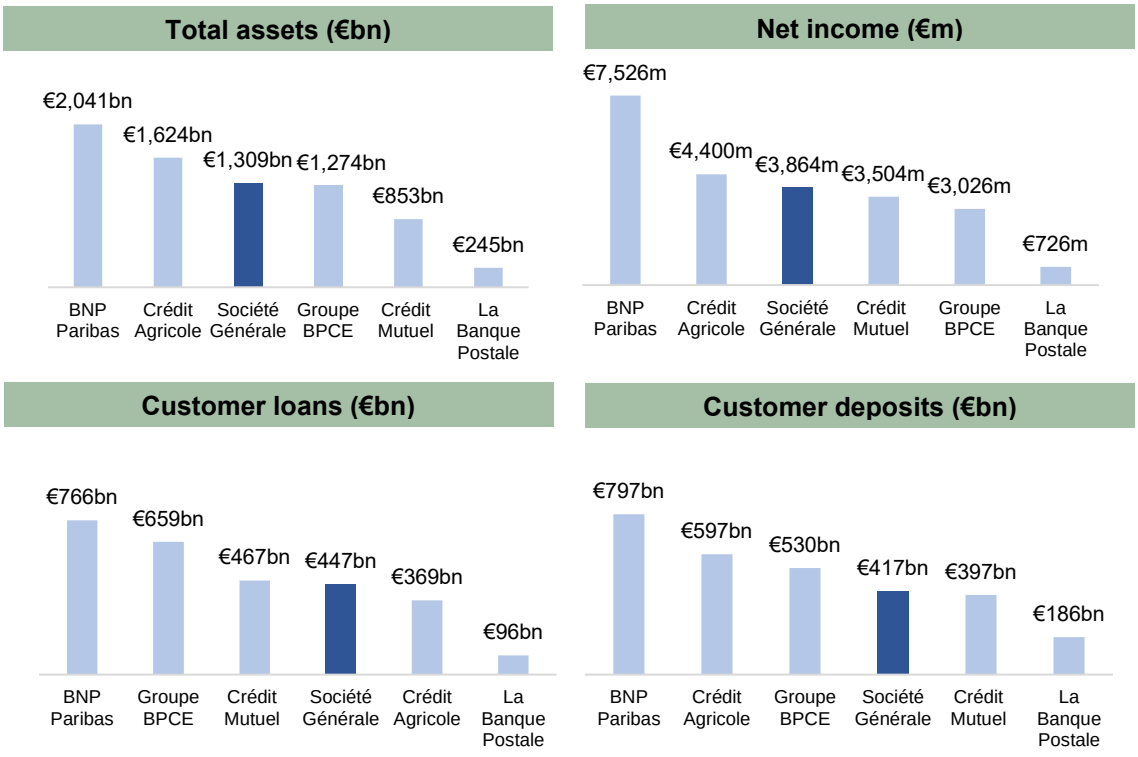


Figure 11 *Top-6 French Banks key figures*

2.1.3 Société Générale profile

Société Générale S.A. (Société Générale or “the Group”) was founded in France in 1864 by Joseph Schneider and a group of entrepreneurs to promote the development of trade and industry. It is a universal bank that operates in 67 countries with c.147,000 employees, over 6,000 branches and serves 31,000 million customers.

The Group is divided into four businesses: French Retail Banking, International Retail Banking, Global Banking and Investor Solutions and Corporate Centre.

The **French Retail Banking** is constituted by of Société Génerale, Crédit du Nord (regional banks) and Boursorama (ranked first in online banking in France). It serves products and services to individuals, corporates and local authorities through a network of c.2,900 branches supported by 33,200 professionals.

The **International Retail Banking & Financial Services** provides financial and insurance services to individuals and corporates in Africa, Russia, Central and Eastern Europe. It is sub-divided into:

- International Retail Banking, including consumer finance activities
- Financial Services to Corporates, including vehicle leasing
- Insurance activities

The **Global Banking and Investor Solutions** segment includes:

- Global Markets and Investor Services
- Financing and Advisory
- Asset and Wealth management.

The **Corporate Centre** is the Group’s central funding department. It includes the income and expenses that are not directly related to the activity of the core business.

2.1.3.1 Financial analysis

Société Générale is the third largest bank in France by assets, with approximately €1,309.4bn as of December 2018.

As it can be seen, Europe is Société Générale's only relevant market, as it accounts for 82% of total revenues and 85% of total assets.

Total revenues are evenly split between French Retail Banking (c.31%), International Retail Banking (c.33%) and Global Banking (c.35%). However, Global Banking accounts for c.51% of total assets.

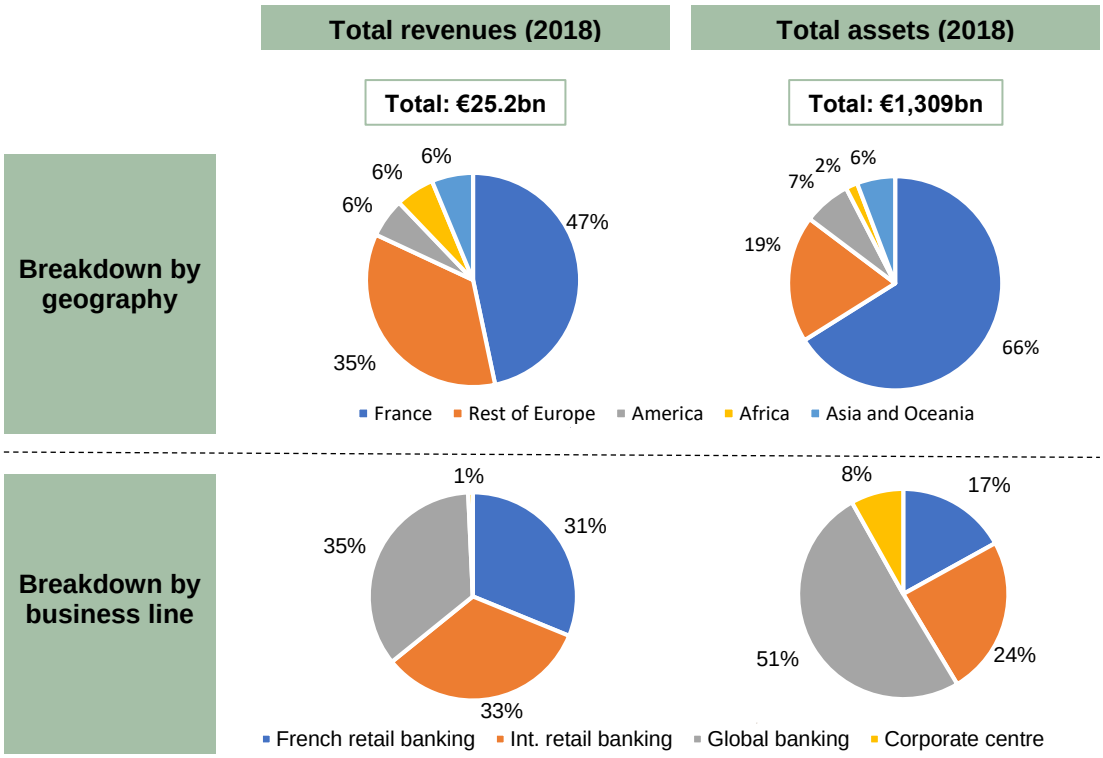


Figure 12 *Total revenues and total assets breakdown by geography and business line*

In order to analyse the total revenues of the bank, I have decided to plot the evolution of its breakdown for the last three years. It can be seen that net interest income has slightly increased in this period, net commissions income has remained stable and net trading income has decreased.

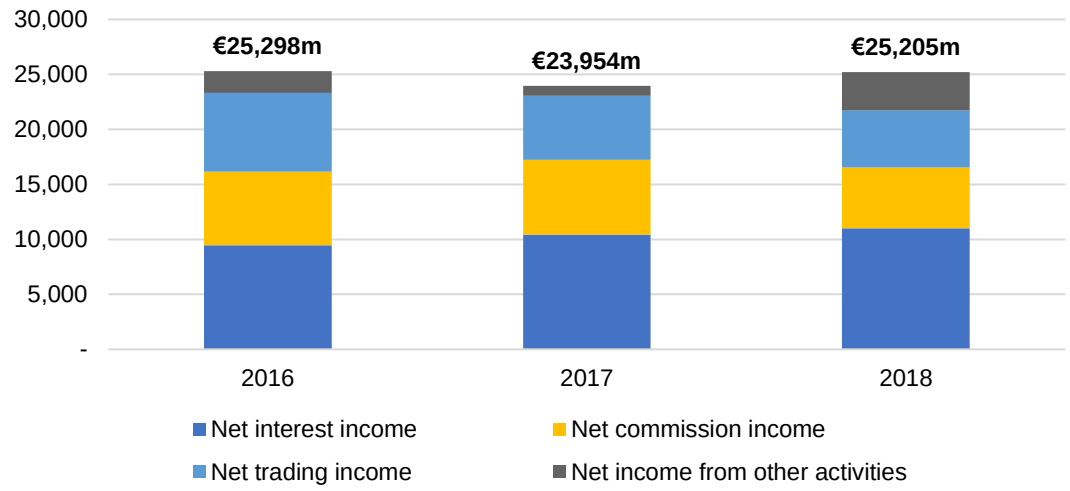


Figure 13 *Total revenue breakdown*

In the following figure I have plotted the evolution of the French banks and CAC 40 share price performance rebased to 100. It can be seen that in the last 15 months there has been a general fall of banks, being SocGen the one that underperformed the most (33.8%, 23.7% and 13.9% fall for SocGen, CA and BNP, respectively).

On the other hand, it can be seen that CAC 40 Index slightly increased a c.3%.

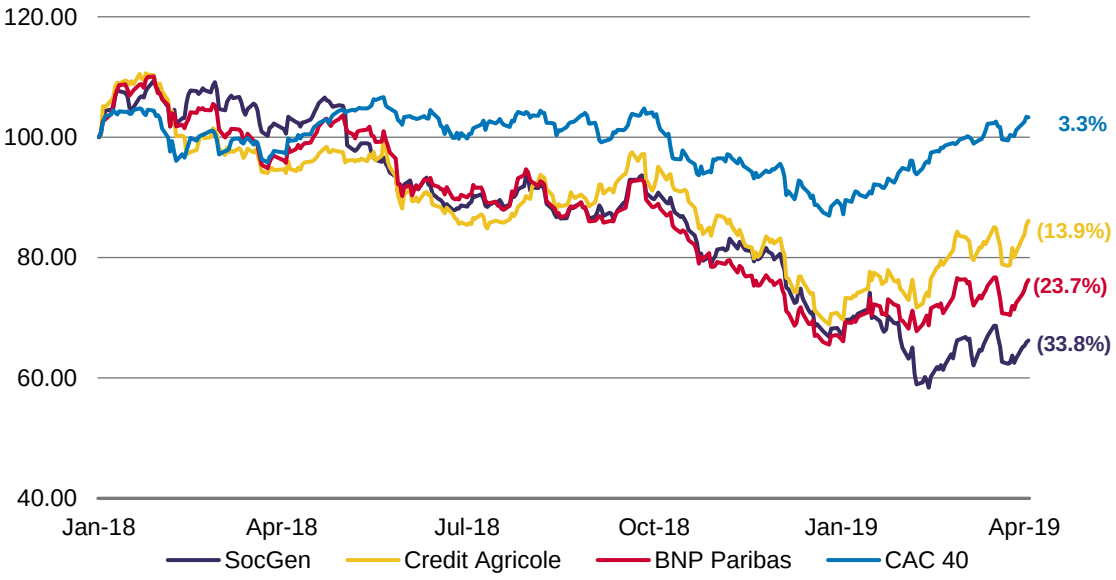


Figure 14 *French Banks share price performance (rebased to 100). Source: Bloomberg*

2.2 Methodology

2.2.1 Valuation methods

In this chapter, I will use the following methods of valuation to obtain the current value of Société Générale:

1. Dividend discount model (DDM)
2. Comparable trading peers' multiples
3. Regression analysis

The first method is an absolute valuation model, which consists on finding the true value of the bank based only on fundamentals. This method differs from relative value models (comparable trading peers' multiples and regression analysis) on the fact that the later use information of other similar companies to assess the worth of the company.

2.2.1.1 Dividend discount model

The Dividend discount model is used to determine the intrinsic value of a stock by summing up the present value of all future expected dividends. This model is the most widely valuation technique used for financial institutions.

In order to obtain the present value of Société Générale, a 2-stage DDM will be used:

$$PV\ of\ Société\ Générale = \sum_{t=1}^{n} \frac{D_t}{(1+K_{e)}} + \frac{PV_N}{(1+K_e)^N} \quad (1)$$

Where:

$D = expected\ dividend\ in\ period\ t$

$K_e = cost\ of\ capital$

$PV_N = present\ value\ of\ Société\ Générale\ in\ year\ N$

The present value of Société Générale in year N is calculated as follows:

$$PV_5 = \frac{D_5 \cdot (1+g)}{K_e - g} \quad (2)$$

Where:

$D_5 = expected\ dividend\ in\ period\ 5$

$g = growth\ rate$

After the analysis of the model, we can affirm that there are three types of variables that determine the value of capital in banks: the dividends paid, the cost of capital (K_e) and the growth rate (g).

a) Financial statements forecasts (drivers and projections)

First of all, it will be necessary to forecast the dividends paid by Société Générale for the next 5 years (2019E-2023E), which correspond to the first stage of the model (n=5). For the rest of the dividends paid by the company (second stage of the model, 2024E onwards) a constant growth rate will be assumed. The Gordon Growth Model will permit us to obtain the present value of the bank in year 2023 (equation 2).

The growth rate is the expected growth that the company will attain following the first 5 years. It is normally considered that the company will grow at the real GDP growth (% y-o-y). In this case, the French economy is expected to grow at a 1.6%[2].

Expected dividends for years 1 to 5 will be calculated based on the common equity tier 1 (CET1), which is the main measure of financial strength used in the banking industry. CET1 is mainly composed by common shares and reserves. The higher it is, the more solvency guarantees the entity will have, although a very high ratio may be inefficient in terms of capital structure.

$$CET1\ ratio = \frac{CET1\ capital}{RWA} \quad (3)$$

Where:

$RWA = risk\ weighted\ assets$

[2] Source: BMI

From the above formula we obtain the CET1 ratio in the end of the period bearing in mind that:

- CET1 ratio is assumed for the coming years
- risk weighted assets are obtained from the projections (% of assets)

Moreover, assuming that:

- CET1 in the beginning of the period is the same as the CET1 in the end of period of the previous year
- CET1 in the end of the period is obtained from formula (2)

The dividend payment is obtained from the following formula:

$$CET1_{\,beginning\ of\ period} + Net\ income - dividend\ (capital\ injections) = CET1_{\,end\ of\ period} \quad (4)$$

Once the timeframe has been chosen, it is necessary to project the balance sheet and the income statement in order to obtain the net income and the total assets. Afterwards, by applying formula (4), it will be possible to calculate the dividends paid by Société Générale.

b) Cost of equity

The cost of equity (K_e) can be defined as the shareholders required profitability, that is to say, what investors expect to earn per year for the money invested in the bank. Following the CAPM model ("Capital-Asset Pricing Model") the cost of equity is calculated as follows:

$$K_e = R_f + \beta_i \cdot [E(R_m) - R_f] \quad (5)$$

Where:

$R_f = risk - free\ rate\ of\ return$

$\beta_i = beta$

$E(R_m) = expected\ return\ of\ the\ market$

As a risk-free rate of return I have selected the 10-year French government bond, which stands at around 0.365%[3] on the day of the valuation.
The beta is a volatility measure that represents the systematic risk of the share. A beta equal to 1 means that the volatility of the share is equal to the one of the market, being < 1 less volatile and > 1 more volatile in comparison to the market. In this case, I have used a 5-year beta which amounts to 1.25[4].

The difference between the expected return of the market and the risk-free rate of return is known as the equity risk premium. The value for the French market is 9.463%[3].

Bearing in mind all these figures, the discount rate amounts to 12.2%.

In order to project the financial statements, I have simplified the Balance sheet and the income statements in several categories that will permit to forecast the expected values for the next 5 years using specific drivers. These categories can be seen in the forecasts on page 36.

A driver is an indicator or ratio formed by the account that is being projected and another one with a high degree of dependency. (See page 35)

Hereafter, the drivers of the most important entries of the balance sheet and the income statement will be explained:

- **Loans**

  Following the broker reports, net loans are expected to grow at 2.1% in 2019, 2.7% in 2020 and 2.8% in 2021-2023 annually.

  In order to obtain the gross loans[5] I assume that the NPL coverage ratio[6] and the NPL ratio[6] will remain at 2018 levels (64.2% and 3.6%, respectively).

[3] Source: Bloomberg
[4] Source: Factset
[5] Gross loans are the sum between net loans and provisions
[6] See definition in Appendix

- **Cash, due from central banks**

  To calculate the cash and the balance with central banks, I have used the driver: % of customer deposits, as the reserve requirement is proportional to the deposits from customers. In this case, I have projected this entry bearing in mind that the ratio will remain constant at a 23.2%.

- **Interbank loans**

  Like cash and due from central banks, I assume that interbank loans will increase proportionally to the customer deposits. The ratio will remain at 15.2% of customer deposits, which is the average from the previous years (2015-2018).

- **Financial assets and investment of insurance companies**

  I assume that financial assets and investment of insurance companies will grow at the same rate as customer loans, which represents the growth of Société Générale.

- **Retail funding**

  From 2016 to 2018, customer deposits have increased on average 3.3% annually. Following the broker reports expectations; this entry will increase 2.6% in 2019, 2.6% in 2020 and 2.9% in the following years (2021-2023).

- **Interest income**

  Interest income is calculated based on a percentage of total earning assets. The later include all the assets which grant interests to the bank. It can be seen that interest income as a % of total earning assets stands at c.2% in years 2016 to 2018, therefore, I assume that will remain at this level in the coming years.

- **Interest expense**

  Following the interest income trend, interest expense is calculated as a % of interest bearing debt. I assume that the percentage for the next five years will remain at 1.8% as in 2018.

- **Net commission income**

  The net commission income accounts for all the commissions earned from all the services offered by the bank, such as credit cards, customer deposits and loans among others.

Based on these drivers I have calculated the expected projections for the next 5 years, which are reflected in the following financials. (See page 36)

c) Valuation

After forecasting the Balance Sheet and the Income statement of Société Générale and applying equations (1), (2), (3) and (4), I have obtained a valuation of **€25.2bn**, which corresponds to **€31.2** per share. See the calculation hereafter:

$$\frac{Price}{share} = \frac{Market\ cap.}{nº\ of\ shares} = \frac{€25{,}235}{807.9m} = €31.2$$

2.2.1.2 Comparable trading peers' multiples

Comparable trading peers' multiples is a relative valuation method that permits obtaining the stock price of a company based on the valuation multiples of its peers. Multiples are a ratio between the market capitalization of a peer and a financial performance metric, which in this case I will use earnings and tangible book value[7]. Peers are selected based on its industry, geography and size (revenue, assets).

Hereafter, you will find the comparables:

[7] See definition in Appendix

	Market cap (€bn)	Share price (€)	P/E			P/TBV		
			2019E	2020E	2021E	2019E	2020E	2021E
Société Générale	21.5	26.6	6.6x	6.1x	5.9x	0.48x	0.47x	0.45x
Credit Agricole	32.0	11.2	8.4x	8.0x	7.6x	0.91x	0.86x	0.82x
BNP Paribas	54.9	43.9	7.7x	6.9x	6.6x	0.66x	0.63x	0.61x
Banco Santander	69.5	4.3	8.4x	8.0x	7.6x	0.98x	0.93x	0.87x
Unicredit	26.5	11.9	6.5x	6.1x	5.7x	0.51x	0.49x	0.46x
BBVA	35.5	5.3	8.1x	7.8x	7.3x	0.87x	0.83x	0.78x
ING Group	43.4	11.2	8.4x	8.0x	7.6x	0.85x	0.80x	0.76x
Barclays PLC	27.4	1.9	7.2x	6.5x	6.0x	0.58x	0.55x	0.51x
Mean			**7.8x**	**7.3x**	**6.9x**	**0.77x**	**0.73x**	**0.69x**
Median			**8.1x**	**7.8x**	**7.3x**	**0.85x**	**0.80x**	**0.76x**
Valuation - Market cap. (€bn)			**28.4**	**26.6**	**25.1**	**34.0**	**33.4**	**32.5**
Valuation - Market cap. (€bn)			**29.6**	**28.2**	**26.7**	**37.6**	**36.9**	**36.0**
Valuation - Share price (€)			**35.2**	**32.9**	**31.1**	**42.1**	**41.3**	**40.3**
Valuation - Share price (€)			**36.6**	**34.9**	**33.0**	**46.5**	**45.7**	**44.6**

Figure 15 *Société Génerale's comparables trading multiples. Source: Factset*

The valuation obtained for Société Générale ranges €25.1bn (P/E 21E) - €37.6bn (P/TBV 19E).

2.2.1.3 Regression analysis

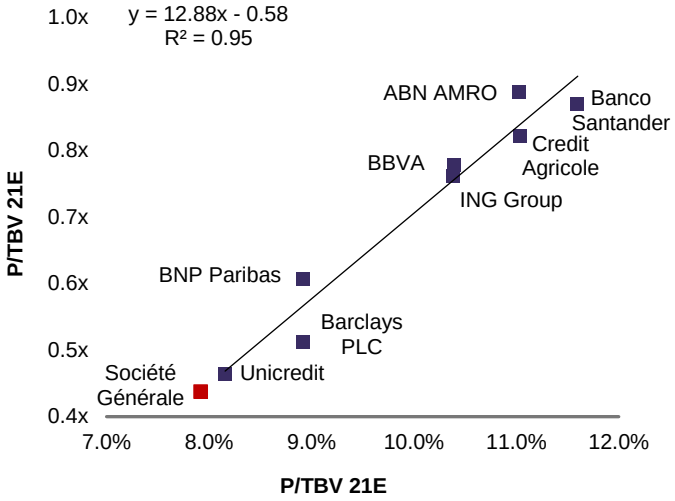
The regression analysis methodology consists on doing a linear regression with the P/TBV and the RoTE of several peers in order to obtain the P/TBV of Société Générale based on its RoTE.

In this case, I have selected the same peers used in the comparable trading peers' multiples method.

Bank	RoTE 21E	P/TBV 21E
Credit Agricole	11.0%	0.82x
BNP Paribas	8.9%	0.61x
Banco Santander	11.6%	0.87x
Unicredit	8.2%	0.46x
BBVA	10.4%	0.78x
ING Group	10.4%	0.76x
ABN AMRO	11.0%	0.89x
Barclays PLC	8.9%	0.51x
Slope		12.9x
Intercept		(0.58x)
R2		94.9%

Figure 16 *Peers used for the linear regression. Source: Factset*

The linear regression obtained with these peers is the following:



RoTE 2021E	7.9%
P/TBV 2021E	0.44x
TBV 2021E (€bn)	58.5
Market cap. (€bn)	**25.6**

Figure 17 *Linear regression*

It can be seen that Société Générale's valuation using this method amounts to €25.6bn.

2.2.2 Football field

After assessing the value of Société Générale with three different methodologies I have plotted the results in the following graph (football field). The range plotted for each methodology correspond to the price obtained +/- a 10%.

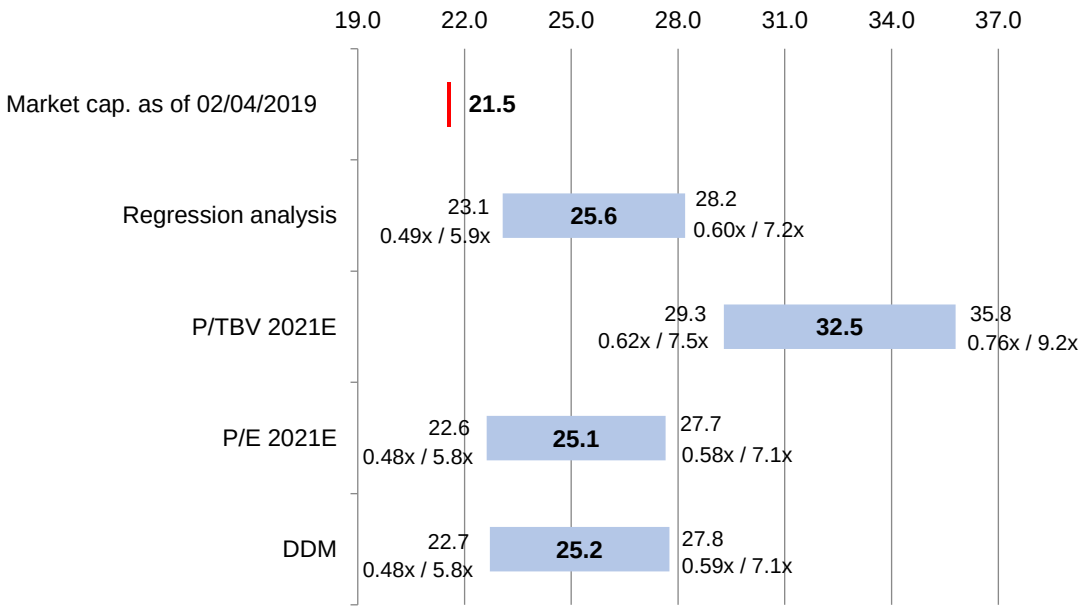


Figure 18 *Football field*

Legend:

In italics, under each valuation:
P/TBV 2021E / PER 2021E

It can be seen that, except for the P/TBV 2021E, the other methodologies obtain a similar equity value for Société Générale (around €25.0bn). However, all methodologies overvalue the company, as in the day of the valuation (02/04/2019) the market cap stood at **€21.5bn**.

Section III: Conclusions

After doing the valuation of Société Générale with several methodologies, it can be seen that the stock was undervalued in the day of the valuation (02/04/2019), as the market cap was lower than the valuation obtained (€21.5bn vs. €25.2bn for the DDM model).

From the perspective of an investor, one should have bought the stock expecting that the price would increase in the future.

After analyzing how banks work and the problems and challenges of this industry, I can affirm that valuing a bank is complex and requires an in-depth study of the sector.

As it can be seen, there is a wide variety of valuation techniques that can be used for banks, but it cannot be said that one is better than the other. In fact, the best thing is to use all of them when taking a decision. It can be thought that being DDM the most complex, and the one more time consuming, it should be more accurate. However, as it does not take into account other peers, it lacks comparability.

Bibliography

Articles and books

- Credit Suisse broker report, *8 February 2019*
- Kepler Cheuvreux broker report, *11 February 2019*
- Jefferies broker report, *8 February 2019*
- Barclays broker report, *8 February 2019*
- Morgan Stanley broker report, *12 February 2019*
- Deutsche Bank broker report, *11 February 2019*
- JP Morgan broker report, *7 February 2019*
- Banque de France, Macroeconomic projections for France, *March 2019*
- Marketline, Company profile: Société Générale, *16 November 2018*
- Marketline, Banks in France, *February 2019*
- Fitch, France Banking & Financial Services report Q2 2019, *January 2019*
- JP Morgan, French banks broker report, *28 February 2019*
- JP Morgan, French banks broker report, *13 March 2019*
- Fédération bancaire Française, The french banking sector, October 2018
- Passport, French: country profile, 8 March 2019
- Marketline, Macroeconomic outlook report,
- European Banking Federation, Banking in Europe: EBF, Facts & Figures 2018
- Eleftherios Aggelopoulos, Understanding bank valuation, *5 December 2016*
- Hirvátová Eva, Methods of banks valuation, *7 January 2010*
- Ernst & Young, Financial perspectives, *March 2013*
- Zeb, European banking study, *2018*

Annual reports and investor presentations

- Société Générale annual report, results presentation, results press release, 2014-2018

Databases

- Bloomberg
- Thomson Reuters Eikon
- FactSet
- Marketline
- BMI
- IHS

Webpages

- Société Générale: www.societegenerale.com/en/investors
- Investopedia: www.investopedia.com
- Breaking into Wall Street: www.breakingintowallstreet.com
- Damodaran: http://pages.stern.nyu.edu/~adamodar/

Appendices

Appendix 1: Definitions

Tangible book value: calculated as the shareholder's equity minus the intangible assets. Banks usually use this metric because they tend to have a poor track of the goodwill.

NPL coverage ratio: calculated as,

$$NPL\ coverage\ ratio = \frac{loan\ loss\ reserves}{non\ performing\ loans}$$

NPL coverage ratio: calculated as,

$$NPL\ ratio = \frac{non\ performing\ loans}{gross\ loans}$$

Appendix 2: Société Générale business segments

	French retail banking			Int. retail banking			Global banking			Corporate centre			Group		
P&L (€m)	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
Total revenues	8,403	8,014	7,860	7,572	7,914	8,317	9,309	9,173	8,846	14	(1,147)	182	25,298	23,954	25,205
Operating expenses	(5,522)	(5,939)	(5,629)	(4,273)	(4,404)	(4,526)	(6,887)	(7,121)	(7,241)	(135)	(374)	(535)	(16,817)	(17,838)	(17,931)
Gross operating income	2,881	2,075	2,231	3,299	3,510	3,791	2,422	2,052	1,605	(121)	(1,521)	(353)	8,481	6,116	7,274
Net LLPs	(704)	(547)	(489)	(779)	(400)	(404)	(268)	(2)	(93)	(340)	(400)	(19)	(2,091)	(1,349)	(1,005)
Operating income	2,177	1,528	1,742	2,520	3,110	3,387	2,154	2,050	1,512	(461)	(1,921)	(372)	6,390	4,767	6,269
Other income	39	42	102	95	78	23	54	(3)	(10)	(271)	254	(267)	(83)	371	(152)
Income tax	(730)	(511)	(607)	(697)	(820)	(841)	(386)	(429)	(281)	(156)	52	168	(1,969)	(1,708)	(1,561)
Net income	1,486	1,059	1,237	1,918	2,368	2,569	1,822	1,618	1,221	(888)	(1,615)	(471)	4,338	3,430	4,556

Appendix 3: Drivers

Balance sheet

Assets

Generic lines	driver	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
Cash, due from central banks	% customer deposits	22.8%	27.9%	23.2%	23.2%	23.2%	23.2%	23.2%	23.2%
Interbank loans	% customer deposits	14.1%	13.1%	14.5%	15.2%	15.2%	15.2%	15.2%	15.2%
Gross loans	% growth	5.2%	(2.1%)	7.1%	2.1%	2.7%	2.8%	2.8%	2.8%
Net loans	% growth	5.2%	(2.1%)	7.1%	2.2%	2.7%	2.8%	2.8%	2.8%
Financial assets	% growth of net loans	5.2%	(2.1%)	7.1%	2.2%	2.7%	2.8%	2.8%	2.8%
Investment of insurance companies	% growth of net loans			(0.6%)	2.2%	2.7%	2.8%	2.8%	2.8%
Equity method investments	% growth	(18.9%)	(39.9%)	(62.2%)	0.0%	0.0%	0.0%	0.0%	0.0%
Intangible assets	% growth	4.5%	10.0%	(0.4%)	0.0%	0.0%	0.0%	0.0%	0.0%
Fixed assets	% growth	35.3%	(8.2%)	70.5%	6.0%	6.0%	6.0%	6.0%	6.0%
Other assets	% net loans	18.5%	16.1%	16.5%	16.5%	16.5%	16.5%	16.5%	16.5%

Liabilities

Generic lines	driver	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
Retail funding	% growth	10.9%	(2.5%)	1.5%	2.6%	2.6%	2.9%	2.9%	2.9%
Central bank deposits	% total assets	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Interbank deposits	% total assets	6.1%	7.0%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%
Financial liabilities at fair value	% growth	(3.3%)	(16.3%)	(1.5%)	2.0%	2.0%	2.0%	2.0%	2.0%
Other interest bearing liabilities	% total assets	9.7%	9.3%	9.7%	10.0%	10.0%	10.0%	10.0%	10.0%
Other liabilities	% assets	15.8%	16.9%	17.4%	17.4%	17.4%	17.4%	17.4%	17.4%

Equity

Generic lines	driver	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
Total equity	% growth	4.8%	(4.2%)	4.5%	3.0%	3.0%	3.0%	3.0%	3.0%

P&L

Generic lines	driver	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
Interest income	% of total earning assets	2.0%	2.0%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
Interest expense	% of interest bearing debt	2.4%	2.1%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Net commission income	% average loans & deposits	1.6%	1.6%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
Other income (expense)	% growth	(5.4%)	(26.5%)	29.0%	2.5%	2.5%	2.5%	2.5%	2.5%
Operating expenses	% assets	1.2%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Tax (25% over Pre-tax profit)					30.0%	30.0%	30.0%	30.0%	30.0%

Ratios

NPL coverage ratio		56.2%	54.3%	64.2%	64.2%	64.2%	64.2%	64.2%	64.2%
NPL		5.0%	4.4%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%

Appendix 4: Forecasts

Balance sheet

€bn	2015	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
A. Loans									
Gross loans	420.0	437.4	430.4	458.3	468.1	480.6	494.1	507.9	522.2
NPL	24.4	23.6	20.6	17.8	16.9	17.3	17.8	18.3	18.8
Provisions	(14.8)	(10.9)	(13.0)	(11.1)	(10.8)	(11.1)	(11.4)	(11.7)	(12.1)
Loans	405.3	426.5	417.4	447.2	457.3	469.5	482.7	496.2	510.1
Total A	**405.3**	**426.5**	**417.4**	**447.2**	**457.3**	**469.5**	**482.7**	**496.2**	**510.1**
B. Other earning assets									
Balances with the central bank	78.6	96.2	114.4	96.6	99.1	101.6	104.6	107.7	110.9
Interbank loans	71.7	59.5	53.7	60.6	64.8	66.5	68.4	70.4	72.5
Financial assets	674.4	661.6	443.9	439.5	449.4	461.4	474.3	487.6	501.3
Investment of insurance companies	0.0	0.0	147.6	146.8	150.1	154.1	158.4	162.8	167.4
Equity method investments	1.4	1.1	0.7	0.2	0.2	0.2	0.2	0.2	0.2
Total B	**826.0**	**818.4**	**760.2**	**743.7**	**763.6**	**783.8**	**806.0**	**828.8**	**852.3**
C. Total earning assets (A+B)	**1,231.2**	**1,244.9**	**1,177.6**	**1,190.9**	**1,220.9**	**1,253.3**	**1,288.7**	**1,325.0**	**1,362.4**
D. Fixed assets									
Intangible assets	6.0	6.3	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Tangible fixed assets	18.0	24.3	22.3	38.1	40.3	42.8	45.3	48.0	50.9
Total D	**24.0**	**30.6**	**29.2**	**44.9**	**47.2**	**49.6**	**52.2**	**54.9**	**57.8**
E. Non-earning assets									
Other assets	79.2	78.9	67.4	73.6	75.3	77.3	79.4	81.7	83.9
Total E	**79.2**	**78.9**	**67.4**	**73.6**	**75.3**	**77.3**	**79.4**	**81.7**	**83.9**
Total assets	**1,334.4**	**1,354.4**	**1,274.2**	**1,309.4**	**1,343.3**	**1,380.2**	**1,420.3**	**1,461.6**	**1,504.1**
G. Deposit and money market funding									
Retail funding	379.6	421.0	410.6	416.8	427.6	438.6	451.5	464.7	478.4
Central bank deposits	7.0	5.2	5.6	5.7	5.9	6.0	6.2	6.4	6.6
Interbank deposits	95.5	82.6	88.6	94.7	97.2	99.8	102.7	105.7	108.8
Other interest bearing liabilities	129.0	125.9	123.0	135.6	134.3	138.0	142.0	146.2	150.4
Total G	**611.0**	**634.7**	**627.9**	**652.9**	**664.9**	**682.4**	**702.4**	**723.0**	**744.2**
H. Non-interest bearing liabilities									
Financial liabilities at fair value	455.0	440.1	368.6	363.1	370.3	377.8	385.3	393.0	400.9
Other liabilities	205.7	213.9	214.8	227.6	233.5	240.0	246.9	254.1	261.5
Funding plug	0.0	0.0	0.0	0.0	6.7	10.3	13.7	17.4	21.3
Total H	**660.7**	**654.0**	**583.4**	**590.7**	**610.6**	**628.0**	**646.0**	**664.5**	**683.7**
I. Equity	**62.7**	**65.7**	**63.0**	**65.8**	**67.8**	**69.8**	**71.9**	**74.1**	**76.3**
Total Equity and Liabilities	**1,334.4**	**1,354.4**	**1,274.2**	**1,309.4**	**1,343.3**	**1,380.2**	**1,420.3**	**1,461.6**	**1,504.1**

Income Statement

€m	2015	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
Interest income	25,431	24,660	23,679	22,678	23,248	23,866	24,539	25,231	25,943
Interest expense	(16,125)	(15,193)	(13,263)	(11,659)	(11,874)	(12,187)	(12,543)	(12,911)	(13,289)
Net interest income	**9,306**	**9,467**	**10,416**	**11,019**	**11,374**	**11,680**	**11,996**	**12,321**	**12,654**
Net commission income	6,678	6,699	6,823	5,524	5,657	5,805	5,972	6,143	6,320
Other income (expense)	9,655	9,132	6,715	8,662	8,879	9,101	9,328	9,561	9,800
Total revenues	**25,639**	**25,298**	**23,954**	**25,205**	**25,910**	**26,586**	**27,296**	**28,025**	**28,774**
Operating expenses	(16,893)	(16,817)	(17,838)	(17,931)	(18,395)	(18,900)	(19,449)	(20,014)	(20,597)
Operating income	**8,746**	**8,481**	**6,116**	**7,274**	**7,515**	**7,686**	**7,847**	**8,011**	**8,177**
Provisions	(3,065)	(2,091)	(1,349)	(1,005)	280	(289)	(311)	(320)	(329)
Net operating profit	**5,681**	**6,390**	**4,767**	**6,269**	**7,795**	**7,396**	**7,536**	**7,691**	**7,848**
Other non-oper. Income / (expense)	428	(83)	371	(152)	-	-	-	-	-
Pre-tax profit	**6,109**	**6,307**	**5,138**	**6,117**	**7,795**	**7,396**	**7,536**	**7,691**	**7,848**
Taxes	(1,714)	(1,969)	(1,708)	(1,561)	(2,338)	(2,219)	(2,261)	(2,307)	(2,354)
Net income	**4,395**	**4,338**	**3,430**	**4,556**	**5,456**	**5,177**	**5,275**	**5,384**	**5,494**
Non-controlling interests	(394)	(464)	(624)	(692)	(669)	(692)	(720)	(720)	(720)
Net income to shareholders	**4,001**	**3,874**	**2,806**	**3,864**	**4,787**	**4,485**	**4,555**	**4,663**	**4,773**